

Two conclusions of prime importance may be drawn from the hypothesis and the evidence here presented, namely:—

1. The scales of fishes bear a segmental relation to the remaining hard and soft parts, and are either repeated consecutively and in oblique rows corresponding to the number of segments, or they may be repeated in rows as multiples of the somites, or segmental reduction may occur which may affect the arrangement of the scales so as to reduce the number of rows below the number of somites indicated by the other soft and hard parts.

2. The peculiar manner of interdigitation of the muscular somites, as indicated by the sigmoid outline of the myocommata as seen from their outer faces, and the oblique direction of the membranes separating the muscular cones, has developed a mode of insertion of the myocommata upon the corium which has thrown the integument into rhombic areolæ during muscular contraction. These areolæ are in line in three directions, and the folds separating them, particularly at their posterior borders, are inflected in such a manner by muscular tensions, due to the arrangement of muscular cones, as to induce the condition of imbrication so characteristic of the squamation of many fishes.

XLIII.—*Upon the Identity of some of the Types of Diplopoda contained in the Collection of the British Museum, together with Descriptions of some new Species of Exotic Iulidæ.* By R. I. POCOCK.

[Plate XVI.]

Part I.—*Notes upon some Types of Diplopoda.*

Lysiopetalum Hardwickii (Newport), Ann. Mag. Nat. Hist. xiii. p. 267 (1844), is based upon a specimen of *L. fetidissimum*, Savi, Opusc. Scient. Bologna, i. p. 334 (1817). There appears to be no foundation for the supposition that this specimen came from India.

Lysiopetalum Richii (Gray), in Griffith's Animal Kingdom (Insects, i.), pl. 135. fig. 4, and further characterized by Newport in vol. xiii. of the Annals of Nat. Hist., has been recharacterized by Latzel as *L. anceps* (Myr. Öst.-Ung. Mon. ii. p. 232) and very possibly as *sicanum* by Berlese (Acari, Myr. e Scorp. Ital. pt. vi. no. 7, 1883).

Lysiopetalum rugulosum and *lineatum* of Newport, Ann. & Mag. Nat. Hist. xiii. p. 267, are based upon two specimens specifically identical with each other and with *L. lactarium* of Say; the latter name has the priority.

Iulus niger, Leach, Tr. Linn. Soc. xi. p. 378 (1815) = *I. albipes*, C. Koch, &c.; Leach's name has the priority.

Iulus punctatus, Leach, loc. cit. p. 379 (1815) = *I. silvarum*, Meinert, Porath, &c.; not *punctatus*, Meinert, Porath.

Iulus pilosus, Newport, Ann. Nat. Hist. xiii. p. 267 (1844) = *fallax*, Meinert, Nat. Tidskr. (3) v. p. 15 (1868), not *fallax*, Latzel, Haase. This species is Leach's *terrestris* (Linn.), but not the *terrestris* of Linné, Porath, and Stuxberg.

Iulus pilipes, Newport, loc. cit. p. 268 (1844) = *I. varius*, Fabr. Spec. Ins. i. p. 528 (1781).

Spirostreptus gracilipes, Newp. loc. cit. p. 269, from the Philippine Islands, is based upon a specimen of *Spirobolus*, and has been redescribed as *Spirobolus julooides* by Karsch, Zeitschr. Naturwiss. (3) vi. p. 65.

Spirobolus pulvillatus and *simillimus*, Newport, loc. cit. pp. 268, 269, are synonyms; the species has been recharacterized as *giganteus* by Porath, Öfv. Vet.-Ak. Förh. 1872, p. 17, and as *ligulatus* by Voges, Zeitschr. wissen. Zool. 1878, pp. 180, 181.

It is extremely common at Lagos.

Spirobolus caudatus, Newport, loc. cit. p. 269, has been redescribed as *P. latus* by Karsch, Zeitschr. Naturwissen. (3) vi. p. 70.

Spirobolus roseus (Gervais), Ins. Apt. iv. p. 181 (1847), of which a co-type is in the British Museum, has been redescribed as *Sp. costulatus* by Porath, Bih. Sv. Vet.-Akad. Handl. iv. no. 7, p. 31.

Spirostreptus corculus, Butler, Ann. Mag. Nat. Hist. (5) ix. p. 330 (1882), belongs to the same category of species as the other known Madagascar forms. It is based upon young specimens, and may be easily recognized by the two wide longitudinal flavous bands which run throughout the length of the body; the head is flavous, with a conspicuous black band between the eyes.

Loc. Betsileo, Madagascar.

Spirostreptus Cowani, Butler, loc. cit. p. 328, is in reality a *Spirobolus* (cf. *infra*).

Loc. Betsileo (Madagascar).

Spirostreptus avernus, Butler (Ann. Mag. Nat. Hist., June 1876, p. 445), from Rodriguez, is a small, slender, Iuliform species of *Spirobolus*. There are four labral pores on each side; the eyes are separated by a space about equal to three times a diameter; the antennæ are very short; the collum laterally resembles that of a *Spirostreptus*, extending as low as the second tergite. The posterior half of the tergites is elevated and smooth above; the median portion is marked irregularly with crescentic impressions; the pores are situated behind the sulcus on the posterior part of the tergites. Scobina absent. The anal tergite is produced into a triangular tail, which overhangs the valves; valves with margins not compressed.

Sp. globulanus of Karsch, from the Comoro Islands, is very close to this, but appears to differ in the number of labral pores.

Spirostreptus sorornus, Butler (*ibid.*), from Rodriguez, is a *Spirobolus* related apparently to *Goëssi* of Porath, but with the median part of the somites scarcely sculptured above and the copulatory feet of a different form.

It is closely allied to *S. comorensis* of Karsch, and to *lumbri-cinus* of Gerstäcker, both of which have been recorded by Karsch from Mayotte.

Spirostreptus simulans, Butler (*ibid.*), from Rodriguez, is based upon

young examples of a species of *Spirobolus*, which will probably prove to be the same as *avernus*.

Spirostreptus Gulliveri, Butler (*ibid.*), from Rodriguez, belongs to the same group as all the Madagascar species. The segments are strongly sulcate, being posteriorly nearly smooth above, but decorated with an obscure anastomosing pattern of low ridges; the anal valves are convex, with their borders uncompressed.

Spirobolus hecate, Butler (*ibid.*), from Rodriguez, is a *Spirostreptus*, allied to all the known Madagascar forms. The posterior part of its somites is thickly punctulate and striolate, and the margins of the anal valves are compressed.

Part II.—*Descriptions of some New Species.*

Spirostreptus stenorhynchus, sp. n. (Pl. XVI. figs. 1-1 d.)

Closely allied to *S. Lunelii* of Humbert, of which *kandyanus*, Humb., is probably the young. Both of these have been well figured and described, so that a brief diagnosis of this new form will suffice.

Colour jet-black, shining, and polished, tergites paler in front; lower half of head and antennæ ferruginous, legs clear yellow.

First tergite with a fine anterior sulcus in front of the marginal sulcus; the anterior angle very obtuse in the female, rounded in male, and a little produced. In the anterior half of the body the tergites are dorsally smooth or nearly so, but in the posterior half they are distinctly punctulate and striolate dorsally; the lateral striæ do not in any of the segments unite with the transverse striolæ of the anterior half. The ventral grooves are short, and the sterna are striolate. *Anal somite* as in *Lunelii*. *Legs* with a series of hairs (about 4) on the lower surface of each segment.

Copulatory feet differing from those of *S. Lunelii* in that the anterior lateral lamina bears three teeth, of which the inferior is the longest and the upper the shortest; in *S. Lunelii* the middle one is much longer than the inferior, and the upper one of *S. stenorhynchus* is absent; the protrusible lamina is distally bifid, the external ramus is short, curved, and sublaminar, the internal very long, curled upon itself, and flagelliform.

Loc. Ceylon (*Cuming*); Punduloya (Ceylon), collected and presented by Mr. E. E. Green. Also another example without locality.

Spirobolus erythrocephalus, sp. n. (Pl. XVI. figs. 2-2 b.)

Colour. Head, legs, and antennæ blood-red; first tergite almost entirely of the same colour, but with a large black patch on each side above the lateral angle, the two patches connected across the middle line by an ill-defined shadowy fuscous band, which is darker on the middle; the second, third, and fourth tergites black at the sides, blood-red above,

with a median black spot; the following tergites in the anterior half of the body similarly coloured, but the dorsal red marks gradually lose their distinctness, becoming first brown, then black; anal somite deep black-brown.

Head smooth and shining, the sulcus distinct below; labral pores obsolete. *Eyes* separated by a space that is about equal to a diameter and a half. *Antennæ* long, much longer than the head.

First tergite projecting inferiorly almost as low as the second, acutely angled, with marginal sulcus, but without other sulci. The rest of the tergites with the posterior portion higher than the anterior, the transverse sulcus complete, the upper surface in front of the sulcus and behind it smooth and polished, the lateral surface thickly and longitudinally striate below, the striæ gradually disappearing above and taking a vertical direction on the anterior part of the tergite; sterna and inferior portion of anterior surface transversely striolate; *pores* conspicuous, above the middle of the side, in front of the sulcus. *Anal somite* nearly smooth, tergite acutely angled behind, covering the summit of the valves; *valves* prominent, the borders strongly convex, almost the posterior half compressed; the sternite large, distinct, and triangular, its angle nearly a right angle.

Legs long, with a single seta beneath each segment, terminal segment padded.

Copulatory feet very wide (see fig. 2 b).

Length about 146 millim., width 10.

Number of somites 52.

Loc. N. Madagascar (*Rev. R. Baron*).

Closely allied to *Sp. Cowani* (Butler), from Betsileo. In *Covani*, however, the anal somite is blood-red, and there is a wide flesh-coloured band along the dorsal surface of the somites. The somites, too, are not so elevated behind and are finely striolate.

Spirobolus urophorus, sp. n. (Pl. XVI. figs. 3, 3 a.)

Colour. Head and legs flavous; posterior half and inferior portion of somites also flavous; anterior half fuscous; a median dorsal flavous band more conspicuous posteriorly. *Antennæ* infuscate.

Body moderately robust, much narrowed posteriorly.

Head smooth, sulcate and striolate above, with two pores on each side of the labrum. *Antennæ* a little longer than the head, the segments, except the first and last, subequal in length. The greatest diameter of the eyes is from above downwards; the distance between them much less than twice this diameter. The collum not projecting so low laterally as the second somite, narrowed laterally, with marginal sulcus, the angle

rounded. The rest of the somites laterally striate, the upper surface lightly striolate. The transverse sulcus shallow, the pores immediately in front of it. Scobina absent. *Anal somite* small; tergite produced into a conspicuous, high, compressed, apically upcurled caudal process; *valves* very lightly convex, their margins largely but not deeply compressed; sternite rounded.

Legs moderately slender, the distal segment with many hairs beneath, the rest with only one.

Number of somites 52.

Length about 42 millim., width 4.3.

Loc. Mahé Island, Seychelles (*H.M.S. 'Alert'*).

Spirobolus Naresii, sp. n. (Pl. XVI. figs. 4-4b.)

Closely allied to *Sp. Goësi*, but differing in colour and in the form of the copulatory feet.

Colour. Legs and antennæ flavous and contrasting strongly with the slate-grey tint of the rest of the body; the posterior borders of the tergites ochraceous.

Head, eyes, antennæ, collum, anal somite, pores, &c. as in *Goësi*; the dorsal surface of the posterior portion of the somites much less closely sculptured, with a transverse row of ring-shaped or crescentic impressions just in front of the sulcus.

Number of somites 49-52.

Length up to 40 millim., width 3.

Loc. Mahé Island, Seychelles (*H.M.S. 'Alert'*).

Spirobolus hoplurus, sp. n. (Pl. XVI. figs. 5-5b.)

♂. *Colour* (in alcohol). Head lightly fuscous above, flavous beneath, first tergite and anal somite blood-red, rest of the tergites black in front, with posterior third blood-red; antennæ and legs flavous.

Body slender, parallel-sided.

Head striolate and convex above, flat and smooth below, with two labral pores on each side. *Eyes* separated by a space a little larger than a diameter, with inner border nearly straight, composed of about six transverse rows of ocelli. *Antennæ* about as long as the head.

First tergite smooth, produced laterally considerably below the level of the second, narrowed, the anterior border and angle evenly rounded, with strong marginal sulcus; the posterior angle also rounded, the border above it emarginate. The rest of the somites smooth, polished, the posterior half slightly elevated and separated from the anterior by a shallow groove, very faintly striate below. *Pores* about the middle of the side, just in front of the transverse groove. *Sterna* lightly striate transversely. Without scobina.

Anal tergite produced above into a very long, straight, caudal

process, which is wide at the base and narrowed towards the apex; *valves* moderately convex, with their margins deeply compressed above, less deeply below; *sternite* distinct, triangular.

Legs very long, each segment furnished with a single seta beneath, the distal segment padded in front below.

Copulatory feet as in fig. 5 b.

Number of somites 48.

Length about 80 millim., width almost 5.

Loc. N.W. Borneo (*R. Everett*). A second example (Borneo, *Lords of the Admiralty*) has 54 somites and measures about 115 millim.

In its slender body, long legs, and produced collum this species superficially resembles a *Spirostreptus*. It is, however, unquestionably a *Spirobolus*, and appears to be a well-marked species, belonging to the same category as *Sp. phranus* of Karsch and *rufo-marginatus* of Tömösvary.

Spirobolus caledonicus, sp. n. (Pl. XVI. figs. 6-6 b.)

♂ ♀. *Colour* fusco-olivaceous, with the hinder borders of the tergites ferruginous or flavous; legs rarely narrowly testaceo-annulate, usually black.

Head convex, smooth and shining, the median sulcus widely interrupted in the middle; on each side about five labral pores, of which the three internal are set close together. *Eyes* composed of about twenty ocelli set in six transverse series, with an acute inner angle, separated by a space equal to about twice a diameter. *Antennæ* a little shorter than the head, scarcely reaching to the hinder border of the first tergite.

First tergite smooth above, narrowed laterally, and extending inferiorly as low as the inferior portion of the second, the angle acute but rounded, the anterior edge lightly sinuate but scarcely emarginate, with scarcely a vestige of sulcus. The rest of the tergites without scobina, smooth and polished behind, the anterior (covered) portion being minutely striolate, and the lateral portion just above the base of the legs finely striate; the transverse sulcus almost obsolete, the pores very minute, situated above the middle of the side and just upon the feeble transverse sulcus. *Sterna* striate.

Anal tergite smooth, its posterior border produced into an angle which just overlaps the top of the valves; the *valves* with their borders lightly compressed or convex and without a trace of compression; *sternite* with subcircular hinder border.

Legs with a seta on the lower surface of each segment, male without tarsal pads, the coxæ of the third to fifth pairs a little enlarged.

Copulatory feet as in fig. 6 b.

Number of somites 42 (40-44).

Length from 52-73 millim.

A number of examples from New Caledonia.

Very closely allied to *Sp. albidicollis* of Porath, from the same locality, but undoubtedly differing in being smooth and polished instead of coriaceous. The colour, too, is distinct, the collum being by no means largely white.

EXPLANATION OF PLATE XVI.

Fig. 1. *Spirostreptus stenorhynchus*, sp. n.; head and first tergite of male.

1 a. Ditto of female. 1 b. Anal somite. 1 c. Anterior aspect of copulatory apparatus. 1 d. Protrusible portion of copulatory apparatus.

Fig. 2. *Spirobolus erythrocephalus*, sp. n.; head and first tergite of male.

2 a. Anal somite. 2 b. Anterior aspect of copulatory apparatus.

Fig. 3. *Spirobolus urophorus*, sp. n.; head and first tergite. 3 a. Anal somite.

Fig. 4. *Spirobolus Naresii*, sp. n.; head and first tergite. 4 a. Anal somite. 4 b. Anterior aspect of copulatory apparatus.

Fig. 5. *Spirobolus hoplurus*, sp. n.; head and first tergite. 5 a. Anal somite. 5 b. Anterior aspect of copulatory apparatus.

Fig. 6. *Spirobolus caledonicus*, sp. n.; head and first tergite. 6 a. Anal somite. 6 b. Anterior aspect of copulatory apparatus.

N.B.—All the figures are enlarged.

XLIV.—Descriptions of some new Genera and Species of Longicorn Coleoptera. By C. J. GAHAN, M.A., of the British Museum (Natural History).

THE genera and species described in this paper are all from Asia.

Philus costatus, sp. n.

Flavo-testaceus; prothorace quam longiore sesqui-latiore, dorso crebre punctulato, lateribus subrotundatis, postice sat distincte carinatis elytris crebre punctulatis, utrisque costis quatuor paullo elevatis, quarum duabus internis distinctioribus, obtectis; articulis antennarum a tertio ad decimum subæqualibus, apice intus angulatis.

♂. Antennis quam corpore longioribus; femoribus subtus longitudinaliter canaliculatis, canaliculis pilosis.

♀. Antennis medium elytrorum haud superantibus; femoribus subtus versus apicem subplanatis, vix canaliculatis.

Long., ♂ 20, ♀ 22-25 millim.

Hab. Siam (*J. C. Bowring*).

Head thickly punctured, with the punctures somewhat coarser towards the occiput; the front divided by a median longitudinal groove, and separated from the clypeus by a rather deep transversely arcuate groove. Prothorax densely but feebly punctured, with a very narrow space along the